

November 1, 2019 meeting, Ohio Mathematics initiative

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- It is my pleasure to welcome you to the University System of Ohio (USO) Mathematics fall 2019 Chairs/Leads Network meeting
- I thank you all for coming and I also wish to thank all that helped organized this meeting working behind the scenes

- At our last meeting we had discussed possible future projects in the Ohio Math Initiative
- Today there are new topics along with updates of ongoing themes in the Ohio Math Initiative
- One of the new topics is a discussion on a possible new Data Science pathway.
- A guest today will be Steve MacEachern, the Chair of the Statistics department at Ohio State

Steve MacEachern

*Professor of Statistics, Department Chair
Faculty*

Areas of Expertise

- Bayesian Statistics
- Model Uncertainty and Selection
- Nonparametric Methods
- Monte Carlo and MCMC Methods
- Robust Methods

Education

- PhD, University of Minnesota (1988)



II. OMI Faculty Group Update (10:15-11:00)

- Co-Requisite Courses (10:15-10:26)

Karl Hess

*Chair of Mathematics, Sinclair
Community College*

Cosmin Roman

*Associate Professor of Mathematics,
Ohio State University*

- Redesign of the Ohio Transfer Module Criteria (10:26-10:37)

Ricardo Moena

*Assistant Department Head, Professor
and Director of Entry-Level
Mathematics, University of Cincinnati*

- Communication, Outreach, and Engagement (10:37-10:48)

Chelle Younker

*Chair of Mathematics, Owens
Community College*

Jim Fowler

*Assistant Professor &
Executive Director STEAM
Factory, Ohio State University*

- Data Collection, Analysis, and Sharing (10:48-11:00)

Donald White

*Chair & Professor of Mathematics,
University of Toledo*

III. Discussion of Possible Data Science Pathway (11:00-12:00)

Steve MacEachern

*Chair of Statistics, Ohio State
University*

Ricardo Moena

Luis Casian

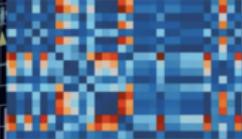
- One institution with an interesting collection of data science courses is Berkeley:

- There is a course at UC Berkeley called **Foundations of Data Science.** <https://data.berkeley.edu/education/courses/data-8>
- The course is designed for entry-level students from any major, who have not previously taken statistics or computer science courses
- “In a world in which we’re surrounded by data, this course enables you to combine that data with Python programming skills to ask questions and explore problems that you encounter in any field of study, in a future job, and even in everyday life.”

- Perhaps one can combine a few skills such as very basic coding Python with reasoning as in a QR course
- Berkeley also has follow-up courses in data science which are offered by faculty from different disciplines. These are called **connector courses**.

- Connector courses weave together core concepts and approaches from Foundations of Data Science course with complementary ideas or areas
- They are offered by faculty across many departments and fields of study.

Data Science Connector Courses

 <p>LEGALST 88 Taking Measure of the Justice System</p>	 <p>STAT 88 Probability & Mathematical Statistics</p>	 <p>COMPSCI 88 Computational Structures in DS</p>	 <p>COGSCI 88 Data Science & the Mind</p>
<p>DATA SCIENCE CONNECTOR COURSES Companion Courses for Data 8</p>	 <p>PSYCH 88 DS for Cognitive Neuroscience</p>	 <p>UGBA 96-4 & 5 Data & Decisions</p>	 <p>STAT 89A Linear Algebra for Data Science</p>
	 <p>GEOG 88 Data Science Applications in Geography</p>	 <p>L&S 88-1 Children in the Developing World</p>	 <p>L&S 88-2 Sports Analytics</p>

Connector Courses from 2015 - Present

Below is a list of all connector courses that have been offered since Fall 2015.

Title	Course number	Description
Data Science for Smart Cities	CIV ENG 88	Design and operation of smart, efficient, and resilient cities nowadays require data science skills. This course provides an introduction to working with data generated within transportation systems, power grids, communication networks, as well as collected via crowd-sensing and remote sensing technologies.
Time Series Analysis: Sea Level Rise and Coastal Flooding	CIV ENG 88B	In this course, we will pursue analysis of long-term records of coastal water levels in the context of sea level rise. We will cover the collection, evaluation, visualization and analysis of time series data using long-term records of sea levels from coastal sites around the world.
Data Science and the Mind	COGSCI 88	How does the human mind work? We explore this question by analyzing a range of data concerning such topics as human rationality and irrationality, human memory, how objects and events are represented in the mind, and the relation of language and cognition.
Computational Structures in Data Science	COMPSCI 88	Introduction to computer science in the context of data science. This course provides a formal and rigorous introduction to the programming topics that appear in Foundations of Data Science, expands the repertoire of computational concepts, and exposes students to techniques of abstraction at several levels, including layers of software and machines from a programmers' point of view.
Economic Models [Ⓢ]	DATA 88	This Data Science connector course will motivate and illustrate key concepts in Economics with examples in Python Jupyter notebooks. The course will give data science students a pathway to apply python programming and data science concepts within the discipline of economics. The course will also give economics students a pathway to apply programming to reinforce fundamental concepts and to advance the level of study in upper division coursework and possible thesis work.
Data Science for Genetics and Genomics [Ⓢ]	DATA 88	Recent years have witnessed a rapid expansion in the creation and utilization of genetic and genomic data across diverse domains such as business, biological research, and medicine. In this Data 8 connector course we will survey relevant questions of interest and employ the methods frequently relied upon by analysts to derive insights from genetic and genomic data. Topics will include the comparison of DNA sequences, dimension reduction, the characterization of transcriptomes, and genome-wide association studies, among others. In addition to hands-on work with data, we will also consider the history of the genetic and genomic sciences and their intersection with current events, ethics, and modern medicine. Students should exit with an understanding of the central role played by data in the fields and an appreciation for the remaining challenges in light of ever-increasing degrees of personalization of, and access to, these sciences. No biological background is required.
Data Science & Immigration	DEMOG 88	This course will cover the small but important part of the rich history of human migration that deals with the population of the United States—focusing on the period between 1850 and the present.